

**ABSTRACT OF THE DISCLOSURE**

A total disc implant (TDI) is provided for total replacement of a spinal disc or discs in a human patient or other mammal, wherein the TDI is designed to maintain a substantially full range of natural motion (ROM) following implantation. The TDI generally comprises, in one preferred form, upper and lower end plates for affixation to adjacent vertebral bodies, with an intervening insert disposed therebetween. The end plates each include elongated part-cylindrical surfaces oriented generally perpendicular to each other, with one of said surfaces extending in an anterior-posterior direction and the other extending in a medial-lateral direction. The intervening insert defines concave upper and lower part-cylindrical seats oriented for respectively engaging these part-cylindrical surfaces, wherein these part-cylindrical seats are defined by offset radii to include a somewhat flattened central base region merging smoothly with upwardly curving radiused sides.